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still in a very mixed condition. Great difficulties arise from the different languages spoken by the representatives of the several nations represented. Another difficulty arises from unequal representation. The attendance is voluntary, the members pay their own expenses, and the time and money required must hinder many who are deeply interested from attending the meetings; and this hinderance is greater in proportion as the distance from the place of meeting increases. The attendance shows this: at the Paris meeting there were 194 Frenchmen and 110 foreigners; at the Bologna meeting there were 149 Italians and 75 foreigners; and at the Berlin meeting, 163 Germans and 92 foreigners. This, it will be seen, does not give general geology a fair representation when questions come up which are to be decided in favor of the majority voting on them. Such votes can only be tentative, and the decisions will hardly be acquiesced in until a more equable representation is brought to act upon the unsettled questions, and many more countries have been fully represented. They do, however, bring out the questions upon which action is to be taken, and prepare the way for a right decision. The congress at Berlin aimed to embody the present condition of European geological science and cartography by preparing a map of Europe in which the legend gave all the larger known divisions of the geological column, and the colors on the map showed their locations.

As it stands now in the list of names drawn up by the congress, we are reminded of the remarks of Whewell, made more than fifty years ago, that the advancement of three of the main divisions of geological inquiry has during the last half-century been promoted successively by three different nations of Europe, — the Germans, the English, and the French. The study of mineralogical geology had its origin in Germany; the classification of the secondary formations, each marked by their peculiar fossils, belongs in a great measure to England; the foundation of the third branch, that relating to the tertiary formations, was laid in France.

With the great accessions which have been made to the general stock of geological knowledge by American geologists, and the general publication of it, it becomes necessary that this should be incorporated in a work which is designed to be comprehensive enough to take in the geology of the world. This list of names for the members of the series undoubtedly satisfied the Europeans who voted upon them; but they are too local, too geographic, too strange, to have a place in any general series. Names must be given in describing new kinds or occurrences of rocks; but they should be provisional, and dropped whenever some more characteristic or generally appropriate name can be found. For calling attention to the several divisions, these names will be very useful, and by their general publication they can be brought to the consideration of hundreds of working geologists, who by their contributions and suggestions can throw light on the subject, though they may never be able to attend an international geologial congress. The advancement of science in modern time is brought about much more by the increased number of workers in the cause than it is by the greater attainments of a few men. With attention properly drawn to this position of geological science, with a great body of workers in the field, with an immense territory in which to work, and with a notice of three years in advance, we can prepare the case so as fairly to present the claims of American geology to a representation in a general system of geology. The congress went no farther in the lists of names: those of the fourth, fifth, and sixth order will be still more difficult to generalize, and it may be that it will be found expedient to leave the names of these orders to be given in the languages of the countries where they find their application.

It might tend to a more equitable representation of the views of members from different countries, if the number of votes to which each country should be entitled could be equitably settled, and the representation from each country should be in some way controlled by the whole body of geologists; but in a country like ours, where most geologists have active duties to discharge in the milder seasons when meetings are held, this cannot always be had. Besides, the work calls for an individual sacrifice of money and time, which many persons think they cannot properly make, either for the public good or for the benefit of science.

These are difficulties which attend the present arrangements for work; and at present I can only bring them to your attention without offering any suggestions for their solution. The objects of the congress are worthy and useful ones, and they will be attained. To us they give direction and point to our investigations and studies, and they will be profitable by leading us to a fuller examination of the whole field of geological science as well as to a more careful and demonstrative study of special fields in which our individual work lies.

ALTRUISM CONSIDERED ECONOMICALLY.[1]

THE primary motive of human action has always been the care of self, this being for man nature's first and greatest law. In his unthinking zeal he has often followed this to a degree unnecessary, and consequently harmful to others. In his savage state, and especially in his primeval condition, where he was subject, like all the lower forms of life, to the law of "the survival of the fittest," he could not consider others' interests, because they were so antagonistic to his own. Often one of two must starve, and each would let it be the other one. He did not even become conscious that he was so acting for a very long period of time. It was the progress from a being not human to the being called man when sufficient intelligence had accumulated to make him conscious that he could live and let live. That point was also marked by and synchronous with the acquirement of such weapons and such skill as enabled man to procure food enough to make the starvation of some unnecessary. Then the war for the survival of the fittest, as known to biology, ceased among men. Ever since, so far as there has been a struggle affecting the survival of the fittest (and that struggle continues to the present day in certain ways), it has been of a different sort, and one which must not be confounded with the biologic law of the survival of the fittest. Major Powell has admirably shown how the strictly biologic struggle has ceased in man; but he has not yet shown, as may be, the character of that struggle, largely intellectual, which still works out certain survivals of the fittest.

Having passed from the point where, if he survive, it must be at the expense of others, man began to recognize and to consider the desires of his fellows; and among others he counted not only his fellows, but mythical and supernatural beings. Thus appeared the greatest natural basis of religion. It is not strange, therefore, that religion should have existed from very early times, and that it should have taught its votaries especially to regard the needs of others. Its mission was to teach a race whose ancestors had been absorbed for untold ages in caring only for self, to adapt itself to a new environment by learning to care for the wants of others. In caring for others the more powerful soon received superior recognition, so it came to pass that supernatural demands took precedence of the rest. When that point had become clear, men were easily tempted to profess to represent the gods, in order that they might share the precedence. In this natural way became established the order of duty which was taught by every religion prior to Christianity; viz., 1. To the gods and their representatives, 2. To self, 3. To others.

Early Christianity must be credited with changing the order of duty to the following: 1. To its one supernatural being, 2. To all others equally with self.

Even under this improved system, many people are led to make great personal sacrifices, in the belief that thereby they are living the noblest life possible to man, when in reality, as it is the object of this paper to show, their sacrifices are either useless, or, what is worse, grossly injurious both to themselves and to the supposed beneficiaries.

During all the untold years in which it was a physical necessity to regard self even to the injury of others, our ancestors acquired a predisposition thereto which heredity has brought down the stream of time. As being no longer a necessity, its practice long since became one of the recognized evils of the world. We apply to it the opprobrious epithet of 'selfishness.' There is a better term, and one which does not imply a moral quality, for there may be devotion to one's own interests which should not be so characterized. Egoism is such devotion to one's own interests: it may be proper,

[1] Abstract of an address before the Section of Economic Science and Statistics of the American Association for the Advancement of Science, at Cleveland, O., Aug. 15-22, 1888, by Charles W. Smiley, vice-president of the section.

and it may be improper. The term does not imply either propriety or impropriety. Let the word 'self-interest' stand for justifiable egoism, and the word 'selfishness' represent unjustifiable egoism.

Egoism, then, was once a necessity; and while it was a condition to existence, it was justifiable, whatever its effects on others might have been. When things changed so as not to render egoism a necessity, man was still as prone to practise it as before. He was acting under the acquired impulses of ages. It was an extremely difficult thing for him to repress his egoism; it was perhaps even more difficult for him to understand that he ought to do so. And yet the change of circumstances had produced a change in its moral quality. From the practice of self-interest he had passed to the practice of selfishness; and he had so passed unconsciously, for the change was in environment, and not in him. The same act that had been a virtue was now a vice. Of course, centuries were needed for this idea to develop and to be disseminated, but at length it came. Although the terms were not in use, the differentiation had taken place. The terms came when needed to express existing ideas.

Long after egoism had differentiated into self-interest and selfishness, came the idea of doing something for others. Man's powers were then so limited that this was not much. Even when he became capable, he was slow to discover it, and slower to act upon it. Heredity bound him. To loosen him was the mission of religion. Whatever its votaries may claim as to its history and purpose, the one great and overwhelming power that religion has had upon the world is this, — it has developed doing for others; it has turned man's attention away from himself to those not himself. A most excellent term to use for this is 'altruism,' — a term first employed only about fifty years ago by Auguste Comte to signify devotion to others or to humanity. Percy Smith, in his 'Glossary of Terms and Phrases,' defines it as "the doing to another as one would be done by; opposed to egoism."

Such terms as 'benevolence' and 'charity' have been generally used to cover the idea of altruism; but in the mind of every one 'benevolence' and 'charity' involve the moral quality of goodness. It is of the greatest importance to have a word like 'altruism,' which does not imply any moral quality, and which covers all we do for others regardless of the consequences, just as 'egoism' covers all we do for self regardless of consequences or of moral quality.

That mankind has thus far regarded all altruism as good, is undeniably shown by the fact that neither English nor any other language has words to distinguish proper from improper altruism. This distinction has not been well developed. It was early seen that the motives were of importance. If we do something for others, it should be with a good motive. The act was declared to be of no subjective value unless the motive was lofty: thus, "Do not your alms before men to be seen of them, otherwise you have no reward of your Father which is in heaven." Calling attention thus to motives was doubtless a great advance upon the preceding times. This improved form of altruism was, however, indiscriminate. Nothing was said nor implied, in the above precept, as to the character of the persons to whom alms were to be given. Nothing was hinted nor thought of the ultimate effect upon the recipient of giving alms, much less of taking steps to prevent any needing alms.

For eighteen hundred years the world has had an altruism which failed to discriminate as to the object, and altruism has often been carried to injurious excess, and yet we have had about as good general results as could be expected under the circumstances. The early step from justifiable egoism to that which discriminated was a long one. From the mind resting on self to considering the immediate wants of others was a great advance. From altruism performed with selfish motives to disinterested benevolence was another grand advance. The order of human progress doubtless required a long discipline in indiscriminate altruism before men should learn to differentiate it by observing its results.

And yet, however grandly its maxims may ring in our ears, whatever praises we may bestow upon its advocates, and whatever satisfaction we may express with the past, the day for indiscriminate altruism has gone by, and we are confronted with present duty. To-day the only man who sells all that he has and gives to the poor is the unfortunate one whom we shut up in the insane-asylum. To-day the only one who takes no thought for the morrow is the tramp or the beggar (the professional beggar has even sense enough to keep a bank account). Those extremes of altruism, non-resistance and self-abnegation, have been discarded. And why? Let us now recognize the virtue in them, and understand also just why they are impracticable.

The virtue of those precepts lies in their power to draw men away from self.

He who sells all he has and gives to the poor, may, if he is very badly eaten up with greed for money, discipline himself in the right direction; but in selling *all*, he has deprived himself of the means of self-support in sickness, and endangered the care of his family. But all this of subjective wrong might be perpetrated to curb a grasping spirit through the loss of property. That, however, which he had no right to do, he has done. He has pauperized the poor. The evil inflicted upon scores, and perhaps hundreds, is in their lessening of self-respect, the cultivation of indolence, the enfeebling of their already weak determinations, the putting farther away of that day when the poor shall be properly paid for their work, and the fostering of that reckless spirit, "The world owes me a living, and I am going to have it." If the next rich man does not sell out and distribute soon enough, they will thirst for his riches, perhaps for his blood.

Every single precept pointing to non-resistance and self-abnegation, while subjectively attractive, ignores the objective and ultimate effect; that is, they all seem to be of benefit to the doer, but make not an iota of discrimination as to the effect upon others, while in fact, as history has shown, and as we are now beginning to know, both are injured, but the greatest harm is done to the supposed beneficiaries.

But to consider the economic effects of altruism by means of which we are to distinguish justifiable altruism from unjustifiable altruism. Now that we have reached the study of social, political, and economic science, we are called upon to analyze the subject, to define our terms carefully, to be sure that we build our sciences on facts, and to state our conclusions clearly. And our conclusions are most hopeful. They are, that in doing real and not seeming good to ourselves we also benefit the race, that in doing good to others it is not necessary nor wise that we inflict sore deprivation or indignity upon ourselves, that thrift and wisdom consist in taking a reasonable thought for the morrow, and that in nothing so much should we take anxious thought for the morrow as when appealed to for alms or to assist the needy.

Better that they suffer hunger to-day and be made self-respecting and self-supporting to-morrow, than that they be fed to-day and then be forgotten to-morrow. We best help others by securing them full justice, and by refraining from injuring them either through malice or through giving them that for which they return no equivalent.

[Of the different forms in which altruism has been exercised in the past, Mr. Smiley has little to say in praise. As to the relief of the poor, he quotes the results of Mr. Low's investigations in Brooklyn, and of similar investigations in Cleveland and Cincinnati, where it has been found, that, with the cessation of out-door relief, the need of such relief has nearly vanished. He maintains that it should always be regretted when circumstances seem to demand attention to immediate needs, and that, if a friendly visitor is permitted to give alms, his and the minds of the receivers are diverted from the great object, — the permanent cure of poverty. Orphan-asylums and foundling-asylums he also severely condemns, holding that every foundling-asylum in America should be instantly disorganized; and in speaking of insane-asylums he considers it surprising, that, while rapid progress is being made in treating many forms of disease, so little knowledge is being obtained concerning the nature, causes, and cure of insanity, and insists that doing good to those now insane may not be of half the importance that it is to find means of preventing insanity in the future. Under the heads of 'Benevolence in Higher Education' and 'Gifts to Workingmen,' he refers to the free education of certain classes of students, which practice he believes to be dying out, and to the fashion which wealthy people have of establishing chapels and libraries for the use of the working-classes. He believes that the working-men

need none of these charities, but that they cry for fair wages and reasonable rents, and they will furnish their own chapels, their own libraries and reading-rooms.]

BOOK-REVIEWS.

Three Cruises of the United States Coast and Geodetic Steamer "Blake" in the Gulf of Mexico, in the Caribbean Sea, and along the Atlantic Coast of the United States, from 1877 *to* 1880. By ALEXANDER AGASSIZ. 2 vols. Boston and New York, Houghton, Mifflin, & Co. 8°. $8.

FEW general readers are aware, or at least appreciate, the very great advances that have been made during the last two decades in our knowledge of the deep sea and its life. With the researches of the lamented Pourtales, and the famous voyage of the 'Challenger,' a new epoch was entered upon in the science of thalassography, as our author aptly calls it, that has brought a vast amount of light upon many vexed problems in biology as well as geology; and in the results already attained America justly lays claim to a large share of the credit. The deep-sea soundings and dredgings carried on with the 'Hassler' and 'Blake' of the United States Coast Survey, and more recently with the 'Fish-Hawk' and 'Albatross' of the Fish Commission, have been of the greatest importance.

A score of years ago, with the old line and sinker, depths of eight thousand fathoms were reported with "no bottom:" now the improved machinery and steel-wire lines have brought up mud from the bottom at over four thousand fathoms, and accurate soundings have reached 4,655 fathoms. The 'Blake' made dredgings at the very great depth of 2,400 fathoms in an hour or two's time: by the older methods twenty-four hours were consumed in dredging from half that depth. With the electrical thermometer, accurate readings of the temperature of the water at any depth the sounding-line can reach may be read from the ship's deck, and specimens of water from near the bottom may be brought to the surface, uncontaminated, for analysis. With all these improved appliances, it is not too much to expect that not many years hence accurate contour-maps will be made of all the more important deep-water bottoms, and a vast deal added to the knowledge of the physical conditions and life of the deepest oceans. What light such knowledge may throw upon the physical conditions of our globe and its geological history one cannot foresee, though surmise.

So, too, the deep-sea life, and the conditions under which it exists, are of interest in themselves, as well as for the relations they bear to others. That the normal conditions of life may exist under a pressure of two or three tons to the square inch, may seem remarkable; but it is more remarkable that the same species may adapt itself to the extremes of pressure, or that the same individual may exist indifferently under differences very many times greater than can the terrestrial animal. "Fishes and mollusks are apparently the only animals which show very markedly the effect of diminished pressure. In fishes brought up from deep water, the swimming bladder often protrudes from the mouth, the eyes are forced out of their sockets, the scales have fallen off, and they present a most disreputable appearance." It is not believed that light can penetrate over four hundred fathoms; nevertheless, Professor Agassiz states that "by far the majority of the animals living at a depth of about 2,000 fathoms have eyes either like their allies in shallow water, or else rudimentary, or sometimes very large." What an animal can need of eyes for perpetual life in intensest darkness is hard to say; but perhaps the presence of eyes, and ornamental coloration, in these deep-sea creatures, may mean that rays of light, perhaps the non-actinic ones, may reach even two or three thousand fathoms.

But space will not permit us to touch upon the many interesting topics of this work. Suffice it to say that the two beautifully printed volumes treat very fully of the general methods of thalassographic work, and the physical conditions and faunæ of the deep Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The work has over five hundred and fifty excellent engravings, the larger part illustrative of characteristic deep-sea types of life. As a sound and permanent contribution to the literature of the deep sea and its inhabitants, the author is justly entitled to great credit.

Entomology for Beginners, for the Use of Young Folks, Fruit-Growers, Farmers, and Gardeners. By A. S. PACKARD. New York, Holt. 12°. $1.40.

IT has been said that a good entomological text-book is one of the most difficult tasks that an author can undertake; and when we consider that there are a million kinds, more or less, of greater and lesser bugs (as the laity will persist in calling insects) in existence, and a great, if not corresponding, variety in their structure and habits, it is not to be wondered at that general entomologists are very few. A high authority upon beetles or butterflies may be, and generally is, very ignorant upon the subjects of bees and bugs, and *vice versa*. The trouble is, the entomologist is yet too busy cataloguing new discoveries, and, as a million more names will be needed before *finis* is reached, he feels no concern except for his own immediate part of the task.

Books, good, bad, and indifferent, there have been in plenty upon insects. The descriptive literature of the two hundred thousand kinds already made known alone must equal that of all the rest of the animal kingdom. But of books that may be classed as serviceable text-books on general entomology, there are very few indeed. Westwood's classical 'Introduction,' Harris's 'Injurious Insects,' and Packard's 'Guide,' have been about the only ones in the English language till lately. It is therefore with the more pleasure that we welcome the present work from the pen of a well-known author and entomologist. We are disposed to find fault with its title, for it really is a better guide to the study of insects than the author's larger work. If there is any thing else, except trivial details, that we would criticise, it is that the author has attempted to compress too much into so small a volume, and that some parts are not as thoroughly arranged and digested as they should be. Its merits are, that it gives in simple language the information and instruction needed by the student who has a fancy or passion for collecting insects, as regards their habits, structure, classification, collection, preservation, and study; and for this purpose we believe it to be the best in the language. To the farmer and horticulturist it will be of less, though considerable, value.

An Elementary Course in Descriptive Geometry. By SOLOMON WOOLF. New York, Wiley. 8°. $3.

THE present text-book is a good introduction to the study of descriptive geometry, its principles and methods being set forth concisely and clearly. After a brief discussion of the principles of projection, the point, the line, and planes and surfaces, are fully discussed. The author has selected the problems so as to elucidate the properties of all geometric combinations, and thus to give the student as well a clear understanding of the methods of descriptive geometry as the greatest possible practice in the use of these methods. Their practical use is always kept foremost before the mind of the student. Thus the use of supplementary planes and projections is introduced by emphasizing the necessity of using special constructions for making clear the character of the object to be represented, and for lessening the constructive difficulties of the case. The methods of rotation and rabattement used for this purpose are fully discussed. The whole field of descriptive geometry is thus treated, the problems being illustrated by numerous clear cuts. The properties of the projections of angles and sections, intersections and tangents, are fully discussed, while the book closes with a chapter on development of surfaces. The conciseness and clearness of the treatment, and the practical arrangement of the material, make the book of great value to the teacher and to the student.

NOTES AND NEWS.

THERE was no address this year by the vice-president of Section D of the American Association.

— The officers of the American Association for next year are as follows: — President: T. C. Mendenhall of Terre Haute, Ind. Vice-presidents: Mathematics and Astronomy, R. S. Woodward of Washington, D.C.; Physics, H. S. Carhart of Ann Arbor, Mich.; Chemistry, William L. Dudley of Nashville, Tenn.; Mechanical Science and Engineering, Arthur Beardsley of Swarthmore, Penn.; Geology and Geography, Charles A. White of Washington; Biology, George L. Goodale of Cambridge, Mass.; Anthropology, Garrick Mallery of Washington; Economic Science and Statistics,